Quantifying the above ground biomass and carbon storage of urban tree species in Sokoto metropolis, North-Western Nigeria

ABSTRACT

Increases in human activities, land use/cover changes and urbanisation have led to continuous accumulation of carbon dioxide and other greenhouse gases in the atmosphere, thus threatening the efficiency of natural carbon sinks such as urban trees. This paper assessed the aboveground biomass and carbon stock of trees in Sokoto metropolis, North-Western Nigeria, using an allometric equation. The metropolis was stratified into five broad land use/cover types from which 200 sample plots of 30m × 30m were generated. Data on tree species and diameter at breast height were collected from all trees ? 5cm in diameter within the plots. A total of 722 trees belonging to 30 species in 17 genera and 14 families were identified. The trees stored 854.73 tonnes of biomass equivalent to 427.37 tonnes of carbon with the highest proportion being stored by Azadirachta indica, Mangifera indica, Adansonia digitata, and Ficus polita. There was a significant difference in tree biomass and carbon stock across the land use/cover types ($F = 4.730$, $p < 0.001$). The Green Area recorded the highest carbon density of 96.5t ha-1 while Farmland recorded the least carbon density (7.4t ha-1). Urban areas have diverse tree species that could contribute significantly to reducing global atmospheric carbon. This potential, which varies with the species, number, and size of trees, as well as land cover, can be successfully estimated using allometric equations.

Keyword: Aboveground biomass; Carbon stock; Diversity; Native species; Exotic species